Cell structure gives African fruit its iridescent hue

Glittering blue colour stays intense years after plant's death.

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Pollia condensata, with its brightly coloured fruit, is found across Africa.
P. Moult

A spectacular African fruit is more intensely coloured than any previously known biological substance. The fruit's metallic blue hue is produced not by a pigment, but by specialized structures in its cells, concludes a study published today in the *Proceedings of the National Academy of Sciences*[1].

Researchers at the University of Cambridge, UK, found that cells in the fruit of *Pollia condensata* had walls made of tightly coiled cellulose strands that reflect light. Slightly different spacings between the strands in each cell reflect light of different wavelengths, producing an iridescent blue colouring.

“The optics are impressive,” says Silvia Vignolini, a physicist at the University of Cambridge and one of the authors of the study. “There are no previous examples of this in nature.”

'Structural colour' is known in animals: peacock feathers, beetle carapaces and the wings of some butterflies are all iridescent, but they use different structures and materials to achieve the effect. It is the first demonstration of structural color in a fruit.

Just for show

The plant is found across Africa, but the fruit has no nutritional value: it contains only seeds, with no pulp. Beverley Glover, a plant scientist at the University of Cambridge and a co-author of the study, thinks that the glittering fruits appeal to birds that use them to decorate nests to attract mates.

Plants have evolved many amazing features to disperse their seeds, but Glover says that “this strategy is brilliant as the plant does not waste any precious energy on providing food for birds".

What is more, century-old specimens still glitter, because there is no pulp to rot, and no pigments that might fade.

Vignolini says that scientists could make similar cellulose structures to provide non-toxic replacements for colourants in the food industry or paper manufacturing.

Doekele Stavenga, a biophysicist at the University of Groningen in the Netherlands who has explored structural colour in animals, says that such colourants would be useful for producing non-toxic pearlescent effects. “The most immediate applications might be in anti-counterfeiting and anti-forgery," he says, because cellulose structures embedded in paper would be hard to copy.

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References

1. Vignolini, S. *et al*. *Proc. Natl Acad. Sci. USA* http://dx.doi.org/10.1073/pnas.1210105109 (2012).

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